

Moab Mill Stakeholder Group  
**Grand County Council Chambers**  
**125 East Center Street, Moab, Utah**  
**July 25, 2000, 10:00 a.m. - 3:00 p.m.**

Stakeholders in attendance:

Kim Schappert, Grand County Council, Co-Chair  
Dianne R. Nielson, Utah Department of Environmental Quality, Co-Chair  
David Hutchinson, Grand County  
Bill Sinclair, Utah Department of Environmental Quality, Division of Radiation Control  
Fred Nelson, Utah Attorney General's Office  
Bill Hedden, Grand Canyon Trust  
Kyle Bailey, Moab City  
Audrey Berry, Department of Energy, Grand Junction Office  
Donna Bergman-Tabbert, Department of Energy, Grand Junction Office  
Jerry Bauk, National Park Service  
Vic Knox, National Park Service  
Harvey Merrell, Grand County Council  
Helen Dawson, U.S. Environmental Protection Agency, Region VIII  
Milton Lammering, U.S. Environmental Protection Agency, Region VIII  
Ted Johnson, U.S. Nuclear Regulatory Commission  
Philip Ting, U.S. Nuclear Regulatory Commission  
Mike Fliegel, U.S. Nuclear Regulatory Commission  
Peggy Mason, Congressman Cannon's Office  
Donna Sackett, Senator Bennett's Office  
Ron Dean, Senator Hatch's Office  
Donna Metzler, Moab City  
Keith Eastin, Pricewaterhouse Coopers, Moab Mill trustee  
Bruce Waddell, U.S. Fish and Wildlife Service  
Steve Hoffman, U.S. Department of Interior, Regional Solicitor's Office  
Loren Morten, Utah Department of Environmental Quality, Division of Radiation Control  
Bruce Rodgers, National Park Service  
Phil Brock, National Park Service  
Bill Stringer, Bureau of Land Management

Guests

Ron Hochstein, International Uranium Corp.  
Toby Wright, Shepherd Miller Inc.  
Tracy Delaney, SRK Consulting Inc.  
Jim Fairchild, U.S. Geologic Survey

Ken Davey, Channel 6,. Moab

Sarah Fields

John Francis Darke

### **Welcome and Introductions**

**Kimberly Schappert, Grand County Council**

**Dianne Nielson, UDEQ**

Kimberly Schappert, co-chair of the meeting, called the meeting of the Moab Mill Stakeholders Group to order at 10:15 a.m., July 25, 2000. Dianne Nielson, Executive Director, Department of Environmental Quality thanked Grand County and Moab City for hosting the meeting and recognized that many people have worked hard preparing for the meeting.

### **Update on Atlas Site Remediation**

**Keith Eastin, Pricewaterhouse Coopers, Trustee**

Keith Eastin gave background information for those not attending the last meeting.

PriceWaterhouseCooper (PWC) was appointed as trustee for Atlas site as part of the Atlas bankruptcy proceedings. Atlas ceased mill operations more than a decade ago. The mill tailings pile is near the Colorado River. The uranium mill tailings and other contaminants comprising the pile is going into the groundwater and, therefore, into the river. Both the pile and groundwater have to be cleaned up to appropriate standards.

The pile contains approximately 13 million tons of tailings, not 10.5 million tons as previously thought. The tailings were placed by slurry operation using a pipeline. The tailings were mixed with water in the pipeline. The remaining water must be removed from the pile before the cover can be put on the pile or the pile can be moved. The pile is like a bowl with a pond in the middle of it, similar in shape to a jelly donut

Contracting for cleanup of the Moab Mill site is broken down into three operations: (1) de-watering the pile (2) cleaning the 270 acres of contaminated dirt, which includes characterizing and moving the dirt and (3) characterizing and cleaning up the groundwater. The Moab mill site is 400 acres in total with 270 acres contaminated with windblown tailings. The other 130 acres comprises the pile itself. Studies are needed to find out what is on or in the 270 acres other than the pile. Additionally, the contractor is determining what is in the groundwater, how fast it is moving, and the extent of the contamination. The Nuclear Regulatory Commission (NRC) has approved the concept of how the de-watering operations are going to be done. PWC will submit a detailed, engineered de-watering plan next week to NRC.

The middle part of the pile has the consistency of toothpaste. It should be viewed as a sponge. The de-watering phase is designed to get the water out. The water will be removed through wicks that are on top of the pile. The water will move up through the wicks with minimal release to the groundwater. The collection of waters will be enhanced by the use of a vacuum system and the removed waters will be put it in a lined evaporation pond next to or on top of the pile.

Keith continued his report by stating that earth-moving operations may commence around the middle of September. The wicks will go in the pile late October or mid-November. The de-watering process will begin around mid-December. We expect to have the water out in 18 months.

Kim Schappert raised a question about the depth of the pile. Keith Eastin said they believe the pile starts at ground level. She asked about the method for pushing on the pile to get the water out. Keith Eastin said pushing on it by loading site-contaminated soils on the top will get the water out. They want it to come out as easily as possible and the contaminated dirt will be used as pressure. These affected site soils will add to the 13 million tons already in the pile.

A question was raised on if there was a plan to stabilize the dirt from the potential to be wind blown once the contaminated soils are removed from the mill site. Keith Eastin said that as part of the reclamation plan, the whole area will be reconfigured. Clean dirt will have to be re-contoured once the contaminated dirt is gone. The final re-contoured surface will not be revegetated. Nature will be allowed to re-seed it. The contractor will work with Fish and Wildlife Service to conserve bird habitat.

A question was raised about having enough funds to complete the project. Keith Eastin said he believes ample funds are available to get through the de-watering operation. The removal and placement of contaminated site soils onto the pile are not cost prohibitive, but finding acceptable rock armor and transporting it to Moab could be the most expensive cost.

Keith Eastin said they've decided to try to figure out where the hot spots are and remediate those until they are not hot anymore rather than assume that the whole is contaminated. According to the financial plan, PWC is not contemplating selling the property. Excavation will be down to the water table. The 270 acres will be graded so that there are not any natural water ponds after the cleanup and to ensure natural water flow. The wicks will be installed immediately after the completion of the site excavation. There is a dust control plan as the 270 acres of potentially contaminated dirt are being cleaned up.

### **3. Groundwater Subcommittee Issues**

**Loren Morton, Division of Radiation Control, for Dan Kimball, Chair, National Park Service**

Loren Morton reported that the groundwater subcommittee has met twice since the last stakeholder group meeting, in Grand Junction and Salt Lake City. Loren Morton indicated that he has been impressed by the open communication and problem solving that has gone on during the meetings. The committee has made a lot of progress. Loren then indicated that there would be four presentations: (1) De-watering Study (2) Groundwater Characterization (3) USGS Fish Study and (4) Interim Measures.

### **A. De-watering Study**

#### **Tracy Delaney, SRK Consulting Inc.**

Tracy Delaney of SRK Consulting Inc. presented information using a slide presentation concerning the de-watering study. Tracy reported on recent efforts by SRK. Samples have been collected with an auger drill to determine where the water is in the pile, how deep it is, what is in the pile, and other geotechnical issues, such as groundwater flow paths and the amount of weight to be put on the pile to aid in release of the water to the wick system. Tracy reported that several closely spaced holes in pile had been placed using a cone penetrometer, which collects information quickly and is able to determine a lot of information concerning water within the pile. By utilizing this technology, SRK has been able to determine that the current rate of seepage out the bottom of the pile is approximately 11 gallons per minute. As the water level goes down in pile, seepage should also go down. When the mill was operating, flow rates were probably higher. Additionally, there is not a lot of water seeping through the pile. When it rains, the water accumulates over the slimes area, and then evaporates by mid-summer. The pH for most of the tailings is neutral, however, the pH is alkaline near the top. Characteristics of the contaminated water are neutral pH, high conductivity, fairly high ammonia, uranium, and radium concentrations.

Tracy then provided pictures during her presentation of a typical wicks system. She indicated that the wicks give a preferential flow for water up the wicks and out the top of the pile. Originally the idea was to put the wicks in while putting the weight (contaminated soils) on. The slime on and in the pile is like toothpaste or frosting. Now the wicks will go in after the weight dirt is placed on to prevent the slime from moving around when inserting the wicks. It will take three months to put weight dirt on and 18 months to get water out. Movement of material will take 60 to 90 days and should begin mid-September.

Keith Eastin estimated the costs to be \$1 million to \$1.5 million to get water out and three-quarter million dollars to do earth moving of contaminated site soils. He has not taken bids yet on earth moving and has not developed a plan yet. PWC and their contractors are still characterizing what is out there.

### **B. Groundwater Characterization Progress Report**

#### **Toby Wright, Shepherd Miller Inc.**

Toby Wright of Shepherd Miller Inc. (SMI) presented information using a slide presentation concerning an update on work that has been done on evaluating the groundwater and the Colorado River. Toby indicated that the objective of the studies is to develop a Groundwater Corrective Action Program that provides the requisite protection of public health and safety and the environment, including the endangered aquatic species in the Colorado River. Toby then described the tasks undertaken by SMI to date, which included:

- Review of existing data
- Identification of data gaps
- Development of work plans to fill data gaps
- Collection of additional data as needed
- Developing an understanding/model of the system
- Develop/screen potential alternatives for a long-term groundwater corrective action plan
- Focus on the areas of geochemistry (tailings, aquifer, river; water/solids), hydrology (tailings, aquifer, river), and ecology (river system)
- Two parallel paths of study: surface water (immediate investigation, characterize conditions such as spatial and temporal changes) and groundwater (aquifer: water and solids, river interaction, mill site and tailings area)
- Sharing of initial investigative results involving Colorado River sampling and Moab Mill site groundwater in April, May, and June 2000.

Toby indicated that there are ammonia plumes in the groundwater concentrated near the tailings. There is also a uranium plume in groundwater concentrated near the mill site. SMI is trying to get profile of the distribution of contamination at different sites. Recent sampling showed the highest river concentrations were seen near Moab Wash in the month of April. In May, concentrations of ammonia and uranium are low in river when Colorado River water levels are higher. The ammonia is diluted by the river water. Samples have been taken on banks of river. There is a sandbar by Moab Wash that creates a backwater. Major flow of river dilutes groundwater, except in the backwater areas where river flow conditions are low or non-existent. The data that SMI is collecting is to help them develop a model. They will then take a look at different corrective action plan scenarios.

SMI is in the process of developing work plans. These include:

- hydrogeologic investigation work plan (geophysical survey, borings/geologic characterization, wells and pumping tests/hydrologic characterization),
- geochemical investigation work plan (soil sampling/testing, water sampling, modeling)
- Field program
- Analyses and modeling/screening alternatives
- Long-term groundwater corrective action plan due to the NRC by March 31, 2001.

Broke for lunch at 12:20 p.m.

Reconvened at 1:05 p.m.

**C. United States Geological Survey Fish Study**  
**Jim Fairchild, USGS**

Dr. Jim Fairchild of USGS reported on a site-specific risk assessment of the impacts of leachates from the Atlas mill tailings pile to Colorado Pikeminnow, (*Ptychocheilus lucius*). Facts concerning the Colorado pikeminnow:

- Largest species of minnow in North America
- Once abundant, now endangered
- Spawns in late June/early July
- Young Pikeminnow require shallow backwaters
- Moab Wash area of Upper Colorado River designated as critical habitat for the species

Jim then described a study by the Grand Junction office of Oak Ridge National Laboratory regarding concentrations of ammonia in the Colorado River at the Moab Mill site. Jim described the effects of too much ammonia on fishes as follows:

- Increased respiration, cardiac output
- Hyperexcitability
- Loss of equilibrium
- Convulsions

Jim then described the objectives of the USGS fish study:

- Conduct spatial mapping to determine exposures
- Conduct lab and in-river toxicity tests
- Compare sensitivity of pikeminnow to other species
- Conduct a site-specific risk assessment using data
- Provide data to risk managers for decision making

As a result of this study, Dr. Fairchild provided the following conclusions:

- The Atlas pile is a site-specific source of ammonia to the Upper Colorado River.
- Ammonia is the primary chemical of concern in terms of threat to endangered fish species. Most recent USGS water quality sampling has shown that ammonia contamination in the backwater area is 100 times higher than previously known.
- Exposures to endangered fish species are highest from August to March (times of low water flow in the river) but are localized to the backwater area.
- Existing state water quality standards are protective of pikeminnow.

#### **D. Interim Measures**

**Toby Wright, Shepherd Miller Inc. (SMI)**

Toby Wright of SMI, using a slide presentation, provided information regarding interim action to protect and clean up groundwater. Toby indicated that the purpose of interim actions or measures is to enhance protection.

Considerations include:

Effectiveness (improve water quality)

Feasibility (ease of implementation)

Costs

Unknowns

Toby identified the following technologies as possible alternatives:

(1) Groundwater Pump and Treat

- 11 wells, conventional treatment
- Effectiveness: fair (brine upwelling)
- Feasibility: fair-good
- Cost: \$980,000 capital, \$250,000 annual O&M; four-year cost: \$1,980,000
- Unknowns: site conditions/brine issues
- Overall rank: low

(2) Groundwater Flow Barrier

- 1,000 ft trench, 4 ft deep x 12 ft wide
- Effectiveness: fair (untested at site)
- Feasibility: good (simple)
- Cost: \$45,000 capital, \$50,000 annual O&M, four-year cost: \$245,000
- Unknowns: site specific conditions
- Overall rank: good

(3) Excavation of Sand Bar

- Removal of 3,200 cy of sand bar
- Effectiveness: good (backwater removed)
- Feasibility: good (simple)
- Cost: \$37,000 capital, \$37,000 annual O&M, four-year cost: \$185,000
- Unknowns: physical disturbance
- Overall rank: moderate

(4) Streambank Modification

- Add fill 1,000 ft x 80 ft x 6 ft
- Effectiveness: good (no backwater)
- Feasibility: good (simple)

- Cost: \$335,000 capital, \$5,000 annual O&M, four-year cost: \$360,000
- Unknowns: physical disturbance
- Overall rank: moderate

#### (5) Fresh Water Application

- Apply river water, dilution
- Effectiveness: good **B** very good (dilution)
- Feasibility: very good (simple)
- Cost: \$7,500 capital, \$25,000 annual O&M, four-year cost \$105,500
- Unknowns: disturbance from application
- Overall rank: good **B** very good

#### (6) In-situ Geochemical Treatment

- 1,000 ft trench, 20 ft deep x 5 ft wide
- Pump air, ammonia to nitrate
- Effectiveness: fair (innovative, nitrate?)
- Feasibility: fair (special equipment?)
- Cost: \$279,000 capital, \$50,000 annual O&M, four-year cost: \$480,000
- Unknowns: re-oxidation, site conditions
- Overall rank: moderate

#### Summary of interim measures alternatives:

- 2 highest ranking alternatives: groundwater flow barrier and fresh water application
- Simple technologies
- Timely, no additional studies required
- Use natural processes

Toby Wright showed photographs of Colorado River water levels at different times of the year. Levels change monthly.

### **E. DISCUSSION**

Groundwater flow barrier and fresh water application are the best options. Both are simple and timely. Interim measures are ~~Aband aids@~~ only. Since measures have a life span of approximately four years, they will overlap with the long-term corrective plan.

Bruce Waddell raised concerns about the details of the short-term plans in preserving the native species in the river. He was concerned about habitat destruction. Fish and Wildlife Services will have to study the option of excavating the sandbar. Shepherd Miller discounted this option, and it will not be proposed to NRC. Toby Wright said that for interim actions, more details are forthcoming. Hopefully it is going to be a dynamic process. They are trying to mitigate the impacts to some of those areas and not restore or create long-term habitat.



Dianne Nielson raised the question on if there is enough money to do both interim and long-term corrective actions and who decides. Keith Eastin said that the decision will be a mutual agreement. Is it better or more cost-effective to do one or both? He didn't have the answer to that question. What they are trying to do is meet a problem that may have been identified on the short-term and that is fish dying in the river. The assumption is that interim measures would be a lot quicker and sooner than the long-term corrective action. Results could be seen in weeks or months, or it could be months and months. A lot of data is not available at this point. It's a good, simple approach, but its effectiveness is unknown.

Bruce Waddell said they are in it for the long haul in terms of protecting the species. He would appreciate having a short summary of how much money they have and where they are in the process. Keith said they have 4.3 million in cash or equivalent. On top of that, they have water rights they could sell. And they have Title X funds coming in, but they don't know from year from year how much will be coming in. It could be \$1 million, but not more than \$4.3 million.

John Darkes made a comment that he was told by NRC that there was not an imminent threat to health and environment coming from the Moab Mill Site. He asked that given this new information (regarding the threat to endangered fish species), has NRC changed its position. A NRC representative said he was not aware of any imminent threat.

#### **4. Update on Atlas Tailings/Naval Oil Shale Reserve national legislation** **Donna Sackett, Senator Bennett's Office**

Naval Oil Shale Reserve/Atlas Tailings legislation has been moving forward in Congress. Senator Bennett introduced initial legislation in May. It passed by unanimous consent on the Senate side. They are now waiting for a legislative conference to reconcile the House and Senate versions. They need to keep the Naval Oil Shale Reserve language so it can stay in the Defense Department. Rep. Hansen will keep the House bill active. The legislation won't see any additional action until September. The bill establishes authorization for funding. Next step in the process is getting appropriations.

#### **5. Next Steps:** **Moab Mill Stakeholders**

- Initial de-watering work will begin in September. Designs will be to NRC by end of the month. NRC still needs to approve the designs. The subcommittee will continue to coordinate the groundwater corrective plan.
- PWC will submit an interim measures plan to NRC by July 26, 2000.
- Toby Wright/SMI will give Keith Eastin a work plan for a groundwater study by August 1, 2000.

- PWC will submit a de-watering plan to NRC by August 1, 2000. PWC will also submit a groundwater corrective action plan to NRC by March 31, 2001.
- The Moab Mill Site groundwater subcommittee will review interim measures plan, de-watering plan, and the ecological report.
- Information will be circulated through e-mail for people to make comments on the various work plans. Comments should be made to PWC and SMI within two weeks of receiving information.
- NRC wants a consensus view of the groundwater committee rather than views from a lot of people. Committee members will E-mail their comments to Mike Fliegel @ NRC.gov. Summary will come from PWC and SMI.
- Toby Wright indicated that the interim measures memo that the trustee will send to NRC will contain the alternatives mentioned here. The memo will not contain much more information than was given today. It's a starting point.
- Bruce Waddell wants to make sure we get responses back. We did commit to review documents and should allow enough time to respond.
- Mike Fliegel said that NRC grants a license based on recommendations made to them and based on a plan that everyone agrees to, including Fish and Wildlife.

## **6. Next Meeting**

To be determined later based on developments in the next few months.

The meeting was adjourned at 3:30 p.m.